



Fugitive Gas Emissions

Data Types: Environment, geology, atmospheric chemistry, economics, policy

Challenge Details: Expansion of shale gas extraction has spurred concerns regarding the potential impact of fugitive gas migration and emissions contributing to greenhouse gases in the atmosphere linked to global climate. Fugitive gas emissions may occur at the shale gas well sites, impacting the environment by escaping through the energy well via surface casing vent flows (SCVFs). Fugitive gas migration can also occur in the vicinity of the wells via shallow aquifers through the water-unsaturated zone towards the atmosphere. In addition, some methane emissions to the atmosphere are associated with transport and processing of natural gas from shale gas plays.

The purpose of this **Challenge** is to explore the major sources, and estimate the fluxes, of fugitive methane released into the atmosphere in conjunction with the development of unconventional hydrocarbon resources on a group-selected jurisdiction in Canada. For example, the Siksika First Nation Community east of Calgary, Alberta, have concerns regarding a number of energy wells on their lands. There are plans to impose stricter fugitive gas emission regulations in Canada, but monitoring the efficiency of such measures requires accurate data on current methane emissions to the atmosphere associated with the shale gas industry. Current “baseline” data are mainly provided by regulators and by industry, but self-reported industry data have been criticized as unrealistic. Methane leakage from wells is well documented, but current emission levels via SCVFs and gas migration remain uncertain. Although there are plans to impose stricter fugitive gas emission regulations, it is difficult to evaluate the efficiency of such measures without a more accurate assessment of current fugitive methane emissions and its key sources.

Questions:

- (1) How reliable are current estimates of methane emissions to the atmosphere associated with shale gas development? What improvements could be made to measurement methods/techniques to generate more accurate methane emission data?
- (2) What are the major sources of methane emissions associated with the shale gas industry?
- (3) Evaluate costs and benefits of better measurement techniques and where they should be used/implemented.
- (4) Estimate the costs and benefits of more stringent fugitive emissions regulations.

The goal of this **ReDeveLoP Challenge** is to identify the areas where the highest methane emission reductions can be achieved in the most economical way possible.

THINK  TANK



Student Name	Discipline	University	Level
Jordan Phillips	Geoscience	Alberta	MSc
Dylan Riley	Geoscience	Calgary	MSc
Victor Gallardo	Policy	Calgary	MPP
Richard Li	Engineering	Waterloo	PhD
Tiago Morais	Geoscience	Calgary	PhD